While CO2 is the main respiratory drive for healthy and normal people, small contributions of other factors makes arterial CO2 reset possible. When these small changes persist for prolonged times, large aCO2 changes are to be expected.

Let me continue with your example.

> When someone with 4.5% PaCO2 enters a chamber with 2% CO2, then their arterial CO2 will go up until the breathing center has registered the change and then what will happen is that their breathing will increase until the arterial CO2 returns to 4.5%CO2. What the CO2 enriched atmosphere will do is prevent you making CO2 excursions below that which is in the atmosphere.

You suggest that if the same person enters the chamber with 3% CO2, his arterial CO2 will again come back, due to his overbreathing, to 4.5%.

If the same man gets 4% CO2 in air, his arterial CO2 will again be 4.5%. To achieve this effect, this person should breathe about 1,000 l/min...

At small CO2 changes (0.1-0.5%), as they studied 100 years ago, there is indeed almost linear growth in ventilation to achieve almost complete compensation and get back very close to old aCO2 values.

But the higher the outer CO2, the stronger the non-linear effect, which gradually drives aCO2 to higher and higher values.

Human can tolerate, for example, 7% CO2 in outer air; it is used now to wean some people from mechanical ventilation. (See abstracts below.)

The effect is obviously non-linear since even at rest there is a contribution of mechanoreceptors. The stronger they are stimulated, the less effect of preset CO2 and higher aCO2. This is how physical exercise works, just CO2 is coming from inside, but arterial CO2 does get higher during exercise with nasal breathing since mechanoreceptors contributes more.

Hence, there is so called "CO2 retention effect". See the study on this below too.

Published studies on breath holding found that when subjects are given, at the end of their maximum breath hold, the air with the same composition as in the lungs (hence no CO2 and O2 drives), they can comfortably hold their breaths for other 10 or 15 s. Why? Due to contribution of mechanoreceptors. Similarly, Valvasala maneuvers or swallowing movements allow us to do maximum breath holds more comfortably.

Finally, an ability to relax (or mental attitude) is another crucial factor, but if people sleep in CO2 rich air, they will relax at night regardless of their fears.

The influence of relaxation is exactly what the studies with 7% CO2 found, which is below.

Best regards, Artour.

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The effects of low levels of CO2 on ventilation during rest and exercise.

Loeppky JA.

Collaborators (1)Loeppky JA.

Lovelace Respiratory Research Institute, Albuquerque, NM 87108, USA.

BACKGROUND: Measurements of pulmonary gas exchange are especially sensitive to low levels of CO2 in the environment; this is an important consideration in measurements in enclosed spaces. METHODS: In order to determine the responses to these low levels, subjects were exposed in five studies to partial pressures of inspired CO2 (PICO2) of 5.7 and 7.5 mmHg for 30 min during basal conditions at rest and to 5.4, 9.4 and 15 mmHg during a progressive exercise to VO2max on a cycle ergometer. RESULTS: In the two resting studies, total pulmonary ventilation and alveolar ventilation were increased by 19% at 7.5 mmHg (1.1% sea level equivalent) and 10% at 5.4 mmHg (0.8% equivalent), with clear evidence of CO2 retention in both studies...

Reduction in ventilator response to CO2 with relaxation feedback during CO2 rebreathing in normal adults.

Holliday JE, Veremakis C.

Department of Critical Care Medicine, St. John’s Mercy Medical Center, St. Louis, MO, USA.

BACKGROUND: Previous studies have shown that relaxation biofeedback reduced time on the ventilator for the difficult-to-wean patients. OBJECTIVE: To test the hypothesis that the underlying mechanism of biofeedback ventilator weaning was the reduction of neural respiratory drive (NRD). DESIGN: Prospective, linear regression analysis. SETTING: Critical care medicine department in tertiary health care hospital. SUBJECTS: Fifteen healthy adult volunteers were randomly assigned to the biofeedback group, and 15 healthy adult volunteers were randomly assigned to a control group. INTERVENTIONS: Relaxation feedback was administered while a single variable, PaCO2, was inputted to the respiratory control system and the output measured. While rebreathing 7% CO2/93% O2, the biofeedback group received a baseline session and a relaxation feedback session and the control group received a baseline session and a no feedback session. MEASUREMENTS AND RESULTS: During relaxation feedback, there was a significant (p < 0.001 to p < 0.05) reduction in the slope of minute ventilation (VI), mean inspiratory flow (VT/TI), occlusion pressure in 0.1 s from onset of inspiration (P100), respiration rate (RR), and diaphragm (DA) EMG compared to baseline. We also found the above breathing parameters decreased significantly for relaxation feedback (p < 0.001-0.05), compared to baseline, at maximum end-tidal CO2 (64 +/- 1.2 mm Hg) (all data are expressed as mean +/- SE). The decrease for VI = -4.65 +/- 1.17 L/min, DA EMG = -0.4 +/- 0.21 microV, P100 = -1.13 +/- 0.56 cm H2O, VT/ TI = -144 +/- 82.91 ml/s, and RR = -3.1 +/- 0.79 breaths/min. No significant changes occurred in these parameters for the control group. CONCLUSIONS: We conclude that the addition of the behavioral input of relaxation feedback results in decreasing the values of respiratory parameters that reflect NRD.
BACKGROUND: Previous studies have shown that relaxation biofeedback reduced the amount of time spent receiving ventilation for difficult-to-wean patients. OBJECTIVE: The present study was begun to test the hypothesis that the underlying mechanism of biofeedback ventilator weaning was the reduction of neural respiratory drive (NRD). DESIGN: Prospective. SETTING: Pulmonary Medicine division in a Veterans Affairs hospital and the St. Louis Regional Medical Center. SUBJECTS: Twenty-four patients who were receiving mechanical ventilation were randomly assigned to either the biofeedback group or the control group. INTERVENTION: Respiratory relaxation feedback (RFB) was administered while a single variable, PaCO(2), was input to the respiratory control system and the output was measured. While rebreathing 7% CO(2)/93% O(2), the biofeedback group received a CO(2) trial session and a CO(2) RFB session, and the control group received a CO(2) trial session and a CO(2) no-feedback (NFB) session. Measurements and results: There was a significant (p < 0.05) reduction in respiratory and EEG parameters for the RFB group at maximal end-tidal CO(2) (mean +/- SE), 70 +/- 0.2 mm Hg) between the CO(2) trial and the CO(2) RFB session compared to the control group where there was no significant difference between the results of the CO(2) trial and the CO(2) NFB session. The mean values for the CO(2) trial and CO(2) RFB session for the biofeedback group were as follows: occlusion pressure 0.1 s from the onset of inspiration, 8.42 +/- 1.08 and 6.48 +/- 0.78 cm H(2)O (which reflects NRD), respectively; minute inspiratory ventilation, 15.84 +/- 0.81 and 13.91 +/- 0.72 L/min, respectively; mean inspiratory flow, 670 +/- 2.28 and 581 +/- 35 mL/s, respectively; respiration rate, 32 +/- 2.28 and 31.2 +/- 2.58 breaths/min, respectively; and chest background electromyography, 4.89 +/- 0.71 and 3.54 +/- 0.54 microV, respectively. The mean electroencephalograph outputs for the CO(2) trial and CO(2) RFB session for the biofeedback group were as follows: mean EEG frequency, 14.78 +/- 0.98 and 13.06 +/- 0.59 Hz, respectively; and beta EEG power, 3.1 +/- 0.03 and 2.39 +/- 0.19, microV(2), respectively; and gamma EEG power, 2.96 +/- 0.34 and 2.24 +/- 0.24 microV(2), respectively. CONCLUSION: We conclude that the decrease in respiratory parameters reflecting NRD induced by RFB represents a key mechanism for the previously demonstrated effectiveness of biofeedback in reducing weaning time from mechanical ventilation.

I have had a lot of experience with various fungal infections and often that is a major contributor to the difficulty in resolving chronic fatigue. One of the people who has written the most effective texts about this is Magid Ali, MD. His book, The Canary and Chronic Fatigue, was one of the first to directly and fully address the issues of probiotics in a mainstream semi medical text. While Ali is a proponent of CO2 and changing your breathing, his system of Lymbic breathing has serious problems and at present he is unwilling to reconsider Buteyko's work and knows about it through conversations with me and reports from his clients who have heard me on the air and come to me for help.

C. Orian Truss MD was the first to address the entire issue of Candida calling it "The Missing Diagnosis". William Crook, MD wrote extensively about it with various diet
recommendations as well as killers like Nystatin and Diflucan in his books best known, The Yeast Connection, and The Yeast Connection and the Woman. However, it was Dr. Ali who first clearly said that you cannot just kill, kill, kill..... You have to strengthen the soil of the intestines or not only Candida, but other difficult little beasties will grow back. Tending that soil is done through putting back in the good guys, Various probiotics to contain and compete with Candida and other toxic species. Also there are certain probacteria like L Plantarum by which will migrate out into the blood stream and assist in dealing with the Candida spores in the blood stream.

L Plantarum is produced by ALLERGY RESEARCH Company. Only purchase this from a very reliable source since it must be kept refrigerated at all times from the initial distributor on down and since it is relatively new, some retailers and their warehouses may not know how to handle it. These are essential in keeping the environment of the intestines healthy, guarding against the overgrowth of destructive and toxic organisms and for the production by the friendly organisms of certain vitamins and other important substances.

The most powerful of these to really begin to build properly in the experience of one of my advisors is the Repleniss series ending with the use of fortify on a regular basis. These are also the most economical in the long run. There is one other quite good one for maintinance which is economical and easy to use which can be taken with you nearly anywhere even without refrigeration which is the one made by Jarrow called Jarrowdophulus. It is enteric coated. Kenny Lok of Nutripharma in New York City will ship them at minimal cost 212-983-8291 He is one of the finest pharmacists in the US and works with a number of fine alternative health practitioners all over the world. Kenny will give you a complete information pack about the best methods of dealing with Candida:

Here are some more:

There are also the earthborne probiotics like Nature bioticshttp://www.upwardquest.com

These are also written about in a short book Candida Albicans: The Quiet Epidemic by Weinberger which is basically an advertisement for them.

Two of the best sources for knocking out Candida with the least amount of problems are East Park's Olive Leaf Extract (this is the most potant variety) about which you can read in a little book by Morton http://www.amazon.com/Olive-Leaf-Extract-Morton-Walker/dp/1575662264

Then there is the product Oil of Oregano or Oreganon. However, I would recommend a run down on it all here where the author also is recommending Threelac which is a combination of what he calls extremely effective probacteria. http://www.candidasupport.org/RESOURCES/comparing-candida-products/?qclid=CLmUl83rlp8CFdx05QodUkGLfw

As those of you who have been in touch with Rosalba know, she recommends regularly eating various foods that are rich in probacteria like organic yogurts, various sour milks products, sourkraut, and many others. These are natural sources so to speak though the prepared ones are of course also natural and far more concentrated. Eating a variety of the foods recommended by Rosalba and others is preventative in nature. Whenever you have to have a course of antibiotics, it is essential that you take good heavy probacteria 2 hours after each antibiotic dose so they will survive and not interfere with the action of the antibiotics. Keep taking a good regular dose of wide spectrum probacteria. The book by Michael Schmidt, Ph.D. Healing Childhood Ear Infections has a great review of what and how probacteria protect, cleanse, and supplement needed vitamins in your intestines.

Finally, issues about the adrenals and thyroid play a huge part in all of this as well. To be purist about Buteyko, he appears not to have dabbled in any of the above. Perhaps through some highly pressured practice, the person is able to through off the Candida as their pause gets higher using fasting, sea salt,
exercise and cold water dousing. If anyone knows of how Buteyko addressed Candida, I would like to know.

My impression is that for over 97% of people the CP test completely reflects their health. Who are the others?

Abnormally high CP can be for many reasons, e.g., near death experience, carotid bodies removed, denervation of respiratory muscles (there are medical publications with breath holding test results for all these situations), loss of CO2 sensitivity due to life-style and environmental causes (lack of deep stages of sleep, cortisol deficiency, calcium deficiency, EFAs deficiency, too low blood glucose, hyper and hypothermia, etc.).

Practically, the last one is the most frequent case (loss of CO2 sensitivity). It can be episodic or chronic (for days or weeks). I had several people with this or near this effect. Many heart patients (they are predisposed to it) can be driven into this state, if the teacher uses pauses, even the CP only, indiscriminately. The CP reflects their health, but they can feel worse after it and repetitive pauses or just one MP can transform them into the state, when the CP would not reflect their health anymore. (Hence, Andrey invented a great exercise for them: relaxation of the diaphragm.)

Their pulse gets much higher after the CP or intensive RB sessions and this is the reason why Dr. Samotesova (Buteyko MD, Chief Endocrinologist of Krasnoyarsk region) stated that no insulin for diabetes 2 requires over 35 s CP and less than 70 for pulse.

For his later writings, his perception and attitude were drastically changed. Buteyko did not mention such words as "we", "our discovery", etc.

1990’s and later
Russian national newspaper “Komsomol’s Truth” 29 October 1997.
The cause of allergy, bronchitis, asthma, and lungs’ diseases, I am sure, is excessively deep breathing. Only its elimination allows complete treatment of these apparently incurable diseases. I proved that 45 years ago…”

By decreasing the depth of breathing, I cured and established the foundation of my method: during deep breathing, hyperventilation of the lungs, the level of carbon dioxide in the blood is lowered; that causes interruption of all metabolic processes, which finally leads to diseases.

Foreword

Thirty seven years passed since I managed to discover a cause of some so-called "diseases of civilization" (broncho- and vascular spasms, allergy, etc.)

... The main postulates of my theory are:
"The problem is that I found a method to get rid of drugs and complex and not safe surgical operations.

... My discovery is 45 years old, but medicine is still on its head.


Thirty eight years have passed since I revealed that a great number of so-called civilisation-induced diseases" widely spread now (bronchial and vasomotor spasms, allergic reactions, etc.) are caused by one and the same factor, namely, alveolar overventilation, or in other words, by deep-type breathing. I conceived the idea of diminishing the depth of respiration, i.e. its normalisation, and I became convinced that it can contribute to recovery.

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Note that people may experience huge changes in their teens or before, but not in their 40s. Also note that being persecuted by the state does not automatically mean that the scientist or the reformer should become paranoid about authorship regarding a certain idea. For example, many revolutionists were persecuted, but they would not get obsessed about claiming own priority regarding their ideas. The state persecutions usually had the oposite effect: the stronger desire to share.

Hence, his persecutions were done by some special people, most likely local KGB, who were manipulating others, in a traditional style of dirty tricks encouraged in others and done with sweetest smiles, in order to create paranoia in Buteyko so that to generate his suspicion, mistrust, anxiety, greed, fantasies, fear and other negative emotions.

The Mafia that persecuted Buteyko has never been officially found. The spiritual leaders of Siberian Gulag, where main Soviet genocide took place, were never persecuted up to the current days. Moreover, there are still many strange and suspicious events going on now in relation to Buteyko movement. Apart from my own life, there were several other “unlucky” mishaps and coincidences, when others died or were harmed or disappeared, like Sasha. Such incidences have already had much higher rate among Buteyko people than among other social groups.

For these reasons it would be sensible for all Buteyko teachers, regardless of their specific views and positions, to demonstrate a simplest or basic professional solidarity in relation to own and public safety.

I suggest that we should report here and discuss any “strange” or “weird” events that can be organized and orchestrated. That should relate to events with Buteyko teachers, their children, relatives, friends and students. [One may remember that killing family members and friends were typical activities of Italian Mafia and German Nazi during WW2.]

Note, that the Mafia people would choose, in such conditions, the most successful and socially-oriented people since the Mafias typically function using a primitive
bullying strategy: applying own senses, not logic, to any social situation or group or events so that to “sniff” the most “dangerous” people and attack them. That should relate to many advanced Buteyko teachers, especially those regularly teaching groups or heavily involved in promotion of the method mainly for social reasons.

In my view, it would be sensible for many such practitioners to keep the identities of their students protected especially electronic data (emails, phone books, daily logs of students, etc.). Hence, when traveling to other regions and especially countries, it is safer not to carry any sources of information regarding own students and keep email boxes clean too.

When Buteyko experimented with his method he had a certain range of initial parameters or health states and a certain final parameters or states of the human body. He tried the method on himself (by starting with less than 10 s CP and getting up to about 3 min), applied the same to his sick patients (typically from about 5-10 s CP up to 60 s CP or more) and his colleagues who were to teach the method.

Obviously, it was not hard for him to find that when MV was huge (and CO2 low), CP was small (the initial state). At the final state (almost no breathing), CP was high. It would make sense for him to claim that each personal path (from disease to health) can be described by a line segment (with the initial and final states as its ends). If we take many people, we get many lines (from disease to health). If we draw all these lines on paper, we shall get a strip (from health to disease) provided that these people do progress from very low to good CPs (over 60 s). It was logical for Buteyko to find a formula that describes the central line of this strip, as a road or path to follow. He also applied for a patent in relation to health zones table (Alex wrote a blog about it and I posted it later too). The patent application with 12 zones of health/disease is below in English.

However, if we start to investigate the narrow range of CO2 or CPs by analyzing many people within 1 zone, then it is sensible to find no correlation because to see the strip from disease to health one needs subjects (first really sick and then really healthy). Otherwise, the investigation has little to do health and disease states. It may generate one point for the Buteyko line. For example, Rosalba’s paper produced this point (30 s for CP, 38 mm Hg for etCO2 which is exactly 5% CO2 at normal pressure, 16 for respiratory rate) and this one point nicely fits in the Buteyko health table, which predicts for 30 s CP, 38 mm Hg for CO2 and 15 for respiratory rate: http://www.normalbreathing.com/index-zones-table.html (see the disease of deep breathing row, which starts with “-3” degree).

Hence, the finding and observations in Rosalba’s paper are in complete agreement with Buteyko formula.

In real life, for most people, there is an additional parameter, morning CP, to be considered and then you will get a more realistic picture what health is about, since the person with 15 s or even higher daily CP can die tomorrow morning from a heart attack.

We definitely should learn more and teach more about the health zones table so that practitioners and students know what health is about.

Best regards, Artour.
METHOD OF ASSESSMENT OF HUMAN HEALTH

Abstract:
1. The method of assessing human health, including the definition of the parameters of functional systems and calculation of health indicators based on the above parameters other than those that form the contingent of the surveyed people who determine the parameter information by measuring the breath holding time of the person after a usual exhalation before the first inhalation without following disturbances in breathing, and then determine and record the basic parameters of main functional systems, and each of them is compared with the informational parameter of the investigated person and obtain the parameter, which is a marker of major functional systems and/or indicator of human health, create a method to assess health through establishment of the scale, while comparing the actual values of each parameter of health survey with the normal value, and based on the received data, health groups can be formed.

2. The method, according to Paragraph 1, but is different in that the scale of health has five categories with a positive sign that characterize the health status of people with different levels of super-endurance and seven categories with a negative sign, which characterize the state of poor health and/or disease in humans with varying degrees of disease severity.


Hyperventilation in patients with recurrent functional symptoms.
Burton CD.
In view of the similarity between the reported effects of hyperventilation and recurrent functional symptom presented in primary care, a study was undertaken to establish whether such symptoms are attributable to hyperventilation. Twenty patients with two or more recurrent functional symptoms which their doctors found difficult to diagnose or
treat, and 30 controls, were studied using symptom questionnaires and a series of hyperventilation provocation tests during which the partial pressure of carbon dioxide (PCO2) and symptoms were recorded. Sixteen cases (80%) had unexplained breathlessness compared with two of the controls (7%). All of the cases recognized familiar functional symptoms during provoked hyperventilation, and in 16 (80%), these included primary physical symptoms; only 23% of the controls recognized any previously experienced symptom. Considerable overlap of PCO2 values between groups meant that absolute values of PCO2 were not useful in differentiating between groups, but cases were more likely than controls to have a PCO2 of less than 4 kPa at rest, three minutes after hyperventilation, or during mental stress (75% of cases fulfilled one or more of these criteria versus 40% of controls). This is the first study in primary care to examine the effect of hyperventilation in a group of patients with multiple somatic symptoms. The findings have implications for the recognition and management of such patients.


The effects of carbon dioxide on exercise-induced asthma: an unlikely explanation for the effects of Buteyko breathing training.

Al-Delaimy WK, Hay SM, Gain KR, Jones DT, Crane J.
Wellington School of Medicine, New Zealand.

OBJECTIVES: To examine the effect of breathing 3% CO2 on exercise-induced asthma (EIA), as a raised airway CO2 level is suggested to mediate the effects of Buteyko breathing training (BBT). DESIGN: Double-blind crossover study, using a standard laboratory-based exercise challenge, with EIA defined as a fall of 15% or greater in the forced expiratory volume in one second (FEV1) within 30 minutes of completing a standard exercise protocol. SUBJECTS: 10 adults with confirmed EIA.

INTERVENTION: Air enriched with 3% CO2 during and for 10 minutes after exercise.

OUTCOME MEASURES: Maximum percentage fall in FEV1 after exercise. Area under curve (AUC) of the decrease in FEV1 with time. RESULTS: Mean maximum fall in FEV1 was similar: 19.9% with air, and 26.9% with 3% CO2 (P = 0.12). The mean AUC for the total 30-minute post-exercise period was 355 for air and 520 for 3% CO2 (P = 0.07). After discontinuing the 3% CO2 at 10 minutes after exercise, there was a further and sustained fall in FEV1. Mean AUC for the period 10-30 minutes post-exercise was significantly greater for CO2 than air (275 and 137, respectively [P = 0.02]). Mean minute ventilation was increased when subjects exercised breathing 3% CO2: 77.5 L/min for 3% CO2, compared with 68.7 L/min for air (P = 0.02). CONCLUSION: Breathing 3% CO2 during exercise does not prevent EIA. The shape of the FEV1 response curve after 3% CO2 suggests that a greater degree of EIA (because of increased minute ventilation during exercise) was opposed by a direct relaxant effect of CO2 on the airway. Increased airway CO2 alone is an unlikely mechanism for the reported benefits of BBT; nevertheless, further study of the effects of voluntary hypoventilation in asthma is warranted.
These are the two Rosalba Courtney articles and passages that led a friend to start wondering if there may be a flaw in the CO2 theory:


On p 60 of "Strengths", she has a section on "Evidence for and against the Buteyko Carbon Dioxide Theory".

"Many Buteyko Method practitioners still strongly adhere to the CO2 theory, but the scientific community is skeptical because research in the past decade has shown that even patients who in the past would have been diagnosed as symptomatic hyperventilators may not show low levels of CO2 at the onset of their symptoms....

"Belief that hypocapnia is the primary or only cause of breathing-related symptoms is out of step with the current thinking of respiratory physiologists, who for some time now have had doubts about the primary importance of CO2 in symptom production....

"It seems that in people with dysfunctional breathing, instability of breathing with fluctuating levels of CO2 is more likely to be present than chronic hypocapnia....

"In recent years, it has become accepted that resting carbon dioxide levels can be normal in people with symptomatic hyperventilation....

"Studies with the Buteyko Method have found that resting carbon dioxide levels do not change after Buteyko training despite reported improvement in symptoms....

"We found that there was a very slight negative correlation between the Control Pause and end tidal CO2, directly opposite to Buteyko's claims."

Dear group,

After years of search, I found one study with published minute ventilation for cancer patients (see the abstract below). The minute ventilation was 12±2 l/min at rest for all 3 groups of people (cancer with dyspnea, cancer without dyspnea, and control subjects; 20 people in each group). All people were 62±2 years old. The study also found that the respiratory rate was 20±1 breaths per minute for cancer dyspnea group patients, and 19±1 for

Respiratory Investigation Unit, Division of Respiratory and Critical Care Medicine, Department of Medicine, Queen's University, Kingston, Ontario, Canada.

Exertional dyspnea is an important symptom in cancer patients, and, in many cases, its cause remains unexplained after careful clinical assessment. To determine mechanisms of exertional dyspnea in a variety of cancer types, we evaluated cancer outpatients with clinically important unexplained dyspnea (CD) at rest and during exercise and compared the results with age-, sex-, and cancer stage-matched control cancer (CC) patients and age- and sex-matched healthy control participants (HC).

Participants (n = 20/group) were screened to exclude clinical cardiopulmonary disease and then completed dyspnea questionnaires, anthropometric measurements, muscle strength testing, pulmonary function testing, and incremental cardiopulmonary treadmill exercise testing. Dyspnea intensity was greater in the CD group at peak exercise and for a given ventilation and oxygen uptake (P < 0.05). Peak oxygen uptake was reduced in CD compared with HC (P < 0.05), and breathing pattern was more rapid and shallow in CD than in the other groups (P < 0.05). Reduced tidal volume expansion during exercise correlated with reduced inspiratory capacity, which, in turn, correlated with reduced inspiratory muscle strength. Patients with cancer had a relatively reduced diffusing capacity of the lung for carbon monoxide, reduced skeletal muscle strength, and lower ventilatory thresholds during exercise compared with HC (P < 0.05). There were no significant between-group differences in measurements of airway function, pulmonary gas exchange, or cardiovascular function during exercise. In the absence of evidence of airway obstruction or restrictive interstitial lung disease, the shallow breathing pattern suggests ventilatory muscle weakness as one possible explanation for increased dyspnea intensity at a given ventilation in CD patients.

The CP would probably be around 15-20 s for such MVs at the time of the test and the tumours grow 24/7 in such conditions. Metastasis probably takes place mostly during nights (morning hyperventilation), when the CP gets below 10 s, and that explains why doctors cannot catch the progress of disease since even normal subjects have about the same minute ventilation at rest during the day.

Other publications about breathing of cancer patients investigated dyspnea (dozens of studies). E.g.,


Louis H Heyse-Moore Senior Lecturer and Honorary Consultant Physician, Vernon Ross Research Nurse, Countess Mountbatten House and Mark A Mullee Senior Faculty Statistical Programmer, Medical Statistics and Computing, University of Southampton, Southampton, UK

Dyspnoea in advanced cancer has been little investigated. We studied 303 patients admitted to Countess Mountbatten House to discover how common and how
severe this symptom is, and in whom it occurs. Of these patients, 55.5% were
dyspnoeic on admission. The prevalence of dyspnoea was 78.6%, however, in
those surviving for less than a day after admission. The mean age was 65.9
years.
Dyspnoea was more likely to be present in those with carcinoma of the
bronchus and breast, and those with lung metastases. Of patients admitted, 11.4%
were rated as severely dyspnoeic (3 on a scale of 0-3). Survival was significantly
shorter as severity of dyspnoea increased.

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Obviously the CP gets down to 1 s before death, as Buteyko noticed for
other terminal conditions. There are many other cancer studies where
increased breathing rates were counted and now breathing frequency
(when it is more than 24 breaths per minute) is one of the three main
factors that define survival of cancer patients.

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Sanchez CM, Elustondo SG, Estirado A, Sanchez FV, Cooper CGR, Romero AL,
Otero A, Olmos LG, Palliative Performance Status, Heart Rate and
Respiratory Rate as Predictive Factors of Survival Time in Terminally Ill
Cancer Patients, Journal of Pain and Symptom Management June 2006,
31(6)
p. 485-492.
Preventive Medicine and Public Health Department (A.O.), Universidad
Auto´noma Madrid; and Primary Care Research (L.G.O.), Madrid’s Area 2,
Madrid, Spain
To determine which symptoms, signs, and characteristics that define the patient’s functional
status predict the survival time in terminally ill cancer patients, a
prospective longitudinal study was conducted with terminally ill cancer patients followed by a Home
Care Support Team. Patients were followed up with at least weekly visits until death,
collecting variables at
each visit. A Cox multivariate regression analysis took into account all the follow-ups in the
same patient. Ninety-eight patients were studied, and 250 evaluations were
done. The mean age was 72 years. The median survival was 32 days. In the multivariate
analysis, three independent variables were identified: Palliative Performance Score of 50 or
under, heart rate
of 100/minute or more, and respiratory rate of 24/minute or more. The variables that were
found to be prognostic in our study are objective, easy, and quick to
measure, and do not require that the professional have special training or experience. The
prediction of survival
time may be improved by considering these variables.

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The Buteyko method immediately addresses 2 factors: heart rate and breathing frequency and prognosis is good before metastasis started. Russian Buteyko doctors found for later cancer stages that it is too late to save the life, but improves its quality. If anybody knows about the reversal of metastatic cancer, please let me know. Best wishes, Artour.

had ME and a galaxy of symptoms including panic attacks and aching muscles. The muscle problem prevented me from walking more than short distances and developed into occasional muscle collapse of specific muscles. This baffled the doctors totally. To cut a long story short all the soreness disappeared within a week of my practising serious breath reduction. I started at CP 15 and by CP 30 all the muscle soreness had disappeared. Panic attacks went by CP 40. I had other symptoms which all also gradually faded away but I had to press on to CP 60 + to get completely in the clear. I believe lactic acid has a role to play in this area but others more knowledgeable than myself can perhaps elucidate.

By the way, the automatic pause is about one tenth of the control pause." Buteyko KP

PS. To be more accurate, in order to evaluate the AP (automatic pause), divide the CP by 10 and then subtract 2 s. Hence, the formula is AP=CP/10-2. E.g., 20 s CP, divide by 2, the answer is 2 s, minus 2 s, equal to zero. Less than 20 s CP – no AP. 30 s CP – 1 s AP, 40 s CP – 2 s AP, 60 s CP – 4 s AP, etc., up to 180 s CP – 16 s AP.

This formula (with minus 2 s) works better for the Buteyko Table of health zones.
She continued reading the familiar text: ‘With the cooperation of other Institutes of the USSR Academy of Sciences (Siberian section), the Laboratory of Functional Diagnostics (Director K. P. Buteyko, PhD (medical sciences) of the Institute of Cytology and Genetics has discovered one of the primary direct causes leading to the emergence and development of the conditions indicated. The cause in question is a breathing dysfunction which takes the form of chronic hyperventilation of the lungs (an abnormal deepening and increase in rate of breathing whether the subject is at rest or in motion)…’ She was pleased to note that the word ‘hyperventilation’ stood out in bold type.

‘… a reduction in the concentration of carbon dioxide in the body, the narrowing of blood vessels and the strong bonding of oxygen with the blood reduces the flow of oxygen to the cells of the heart, brain and other organs, damages the bronchial tubes and blood vessels, stimulates the nervous system, adversely affects sleep, and gives rise to shortness of breath, headaches, tinnitus, angina attacks, disorder of the metabolism, weight gain, raised blood cholesterol level, a rise or fall in arterial pressure, biliary dyskinesia, constipation and other bodily disturbances …’ Kolya the lab assistant had begun reading the text aloud, but was now told by the others to pipe down.

‘… Normalisation of breathing immediately triggers a healing process which ultimately eliminates a whole range of the symptoms indicated,’ read Natalya, the sentence jumping out at her. At the foot of the second page, the handbook stated that normalisation of breathing offers virtually complete protection against heart attack, stroke, progressive sclerosis of the vessels and emphysema. And a little further on, there appeared the first of three diagrams included in the handbook. It was headed ‘Normal Breathing’ and was the Lab staff’s attempt at illustrating a healthy person’s pattern of breathing. The ideal to strive for. An undulating line with horizontal sections between the peaks showed that in a really healthy person, an inhalation lasts two to three seconds. The exhalation lasts a second longer. The automatic pause before the next inhalation generally corresponds to the length of the exhalation.

Laying the handbook aside for a moment, Natalya recalled the heated debates which had developed when the diagram was being worked on. Most of the staff thought it was vital to include a diagram of this sort. “If we’re asking people to breathe normally, then we need to give them a benchmark,” an agitated Dr Bubentsova had insisted. In the end, Buteyko had gone along with them, but he still voiced one doubt. He was completely behind the idea of including a benchmark for health, but was seriously concerned that patients might misinterpret it.

“Of course they should know about it,” he said cautiously, “But I’m worried they may be so eager to count the seconds that they lose sight of the main object – reducing depth of breathing by means of relaxation.”

Subsequent history proved him right. On numerous occasions they had to discourage people from putting too much emphasis on counting seconds for the inhalation and exhalation. But you won’t get very far in any science – least of all in medicine – without trial and error. It was a stage they had to go through.

At first, the lines ‘the patient must have a sound knowledge of what normal breathing should be like, and be able to measure their breathing rate and determine the length of time the breath is held …’ had seemed entirely uncontroversial. There followed a detailed explanation that each breath consists of an inhalation, an exhalation and a pause (as illustrated in Figure1). Breathing exclusively through the nose was advocated, whether the subject was at rest or undertaking gentle physical activity. A detailed breakdown was given. First, a slow inhalation lasting 2-3 seconds and as shallow as possible (0.3-0.5 litres, almost imperceptible
to an observer). This to be followed by a calm, passive, complete exhalation lasting 3-4 seconds. Then a pause (!) of 3-4 seconds, a further inhalation, and so on …

It was brought to the attention of the uninitiated reader that a healthy person’s rate of breathing is 6-8 times per minute. Under these conditions, ventilation of the lungs does not exceed the required norm of 2-4 litres a minute, thus providing the six and a half percent CO2 content within the pulmonary alveoli which is so vital for the body.

It seemed as if everything in this portion of the text had been tweaked to perfection, but subsequent experience showed that, while a patient must of course know how to count his own breathing rate per minute, on no account should he often resort to such counting – far less at every moment of his practice!

Experiments revealed that if a patient concentrated his attention on actually keeping count of his frequency of breathing the result was even greater overbreathing. And that results not in a reduction in breathing rate per minute, but in an increase!

But of course all these methodological amendments came later, with the benefit of experience. For the moment, in the run-up to the May holiday, the Laboratory was proudly celebrating a great achievement: its first legally published methodology.

The staff were still animatedly swapping reactions to particular passages, and in the corridor patients were already discussing how they could get their hands on one of the precious copies.

Natalya read through the section entitled ‘How to correct (or normalise) breathing’ twice. After all, it was no time at all since Konstantin Pavlovich’s assistants had helped him polish the final version so painstakingly! ‘…

**Buteyko breathing chart: Alveolar CO2 in MMHG**
This chart shows the partial pressure of carbon dioxide in the pulmonary alveoli. This measure is given for each disease in millimetres of mercury. Chart explained in bold text below, paragraphs five, seven, ten, thirteen and fourteen.

Excerpt from Volume 1 Chapter 26: Professor Chugunov Harrumphs. The patient demonstration at the research conference. Pauses and illnesses. Can you lose weight from overbreathing? The preliminary trial is a success but the head doctor is sacked.

...Her statement excited a great deal of interest among the audience.

After this, one patient after another mounted the stage. For each one, the clinic doctors who had attended Natalya’s course with the groups gave an introduction. During their presentations the patients responded to a wide range of questions from the floor. How many years had they been ill? Had their attacks stopped a
long time ago? Weren’t they worried that their afflictions would recur?

“I wonder if I might ask a question?” A rather thin surgeon in horn-rimmed spectacles raised his hand from the fourth row. “We have seen evidence today of your undoubted success, with examples provided by all your patients. They have been able to rid themselves of their asthma attacks. Many of them have also managed to normalise their blood pressure, ameliorate angina etc.” The surgeon nodded in the direction of the front row. “Yet the means of achieving all these things was always the same - they stopped breathing deeply. I wonder if you could explain the process involved in a little more detail for us. For example, how long must the control pause you mentioned in your presentation be, in order to guarantee relief from a particular disease?” The surgeon looked penetratingly at Natalya, as though seeking to lure her into piling a great heap of disparate, haphazard facts on their heads...

“I understand your question.” Natalya went over to the stand with the posters. She removed the top one illustrating respiratory metabolism in the human body and revealed underneath it a bar chart with five bars.

“This chart shows the partial pressure of carbon dioxide in the pulmonary alveoli,” she explained unhurriedly, with emphasis. “It's a very interesting chart,” her audience had become unusually quiet, “although I hadn’t planned to spend much time on it today.”

Natalya gestured the surgeon to sit down. “We are currently talking about the clinical trial conducted to assess the effect of the Method on asthma sufferers and that’s what the official report will focus on. However, since you have touched on this issue I am not going to avoid it.

“This poster illustrates our experimental data, which enable us to calculate, for example, what length of control pause is necessary generally speaking to relieve the patient of very common, serious diseases such as bronchial asthma, hypertension, angina and obliterating endarteritis.”

She paused for a moment. The doctors had grown serious and couldn’t tear their eyes away from the mysterious chart...

“I have spent some time here explaining that the Method does not bring temporary relief, it is a lifelong weapon in the fight against illness. I said that only once a patient has achieved a control pause of 60 seconds is he or she insured against illness.” Natalya picked up the wooden pointer which leant against the poster stand.

“What I’ve said may sound convincing but it’s still only words. This chart, however, is a different matter.” Natalya tapped the poster which had attracted such universal, rapt attention. “Another aspect of Dr Buteyko’s great Discovery is that he does not base his work purely on a verbal exposition of his principles. He has also undertaken very precise mathematical analysis. Figures, figures and more figures - that’s his creed!

“We have just one task here today - to validate treatment using the Method, but only in relation to asthma.” She put down the pointer and straightened a couple of the posters which had slipped. “However, this does not mean that the Volitional Elimination of Deep Breathing is only capable of relieving this one condition.

“Indeed, Dr Buteyko himself initially cured his own malignant hypertension with the aid of the Volitional Elimination of Deep Breathing.” Natalya saw the surgeon who had originally asked her this tricky question almost leap of his seat in agitation at her words.

“Naturally,” she again passed the pointer across the chart, “at our Laboratory we have conducted and continue to conduct research into the effectiveness of the Method in relation to other diseases linked to a CO2 deficiency in the body. The five bars in this chart bear out far more eloquently than words the fact that you can only become completely healthy, by achieving a control pause of one minute without the risk of getting rid of one disease only to develop another.” Natalya looked defiantly at the surgeon, who had barely regained his composure.
“Of course, I am exaggerating slightly. The chart doesn’t show the control pauses for each of the five conditions. You can see from the heading that it deals with partial pressure of carbon dioxide in the lungs. This measure is given for each disease in millimetres of mercury and is shown above the relevant bar on the chart. This is, of course, much more accurate than patients empirically measuring their own control pauses. Instruments are instruments. Nevertheless, in answer to the question, I would say that, if we look at the table showing pulmonary ventilation criteria next to the chart (she moved the pointer across the seven stages leading to death depicted on the table), it is possible to convert millimetres of mercury to a measurement that approximately corresponds to the control pause.

“Then,” Natalya took a piece of chalk and made some simple calculations on a small blackboard, “we end up with a scenario where on average we can get rid of bronchial asthma by increasing the control pause to 25 seconds. I would emphasise, however, that this is an average! It’s very approximate. A significant role is played by the age of the patient and the severity of their condition. Also, please note that 25 seconds is definitely the control pause and certainly not the maximum pause.”

Buteyko Breathing Chart: Pulmonary Ventilation Criteria
### Pulmonary Ventilation Criteria

<table>
<thead>
<tr>
<th>Condition of the Body</th>
<th>Type of Breathing</th>
<th>Extent of Dysfunction</th>
<th>Alveolar CO₂</th>
<th>Control Pause (CP) (sec)</th>
<th>Maximum Pause (MP) (sec)</th>
<th>Pulse per minute</th>
</tr>
</thead>
<tbody>
<tr>
<td>Super Endurance</td>
<td>Superficial</td>
<td>I</td>
<td>6.8</td>
<td>48</td>
<td>120</td>
<td>57</td>
</tr>
<tr>
<td></td>
<td></td>
<td>II</td>
<td>7.1</td>
<td>48</td>
<td>100</td>
<td>55</td>
</tr>
<tr>
<td></td>
<td></td>
<td>III</td>
<td>7.3</td>
<td>48</td>
<td>100</td>
<td>55</td>
</tr>
<tr>
<td></td>
<td></td>
<td>IV</td>
<td>7.4</td>
<td>53</td>
<td>150</td>
<td>50</td>
</tr>
<tr>
<td></td>
<td></td>
<td>V</td>
<td>7.5</td>
<td>54</td>
<td>180</td>
<td>48</td>
</tr>
<tr>
<td>Normal</td>
<td></td>
<td>I</td>
<td>6.5</td>
<td>46</td>
<td>60</td>
<td>90</td>
</tr>
<tr>
<td></td>
<td></td>
<td>II</td>
<td>5.5</td>
<td>36</td>
<td>40</td>
<td>65</td>
</tr>
<tr>
<td></td>
<td></td>
<td>III</td>
<td>5.0</td>
<td>36</td>
<td>40</td>
<td>60</td>
</tr>
<tr>
<td></td>
<td></td>
<td>IV</td>
<td>4.5</td>
<td>32</td>
<td>40</td>
<td>70</td>
</tr>
<tr>
<td></td>
<td></td>
<td>V</td>
<td>4.0</td>
<td>28</td>
<td>10</td>
<td>80</td>
</tr>
<tr>
<td></td>
<td></td>
<td>VI</td>
<td>3.5</td>
<td>24</td>
<td>5</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td></td>
<td>VII</td>
<td>3.5</td>
<td>24</td>
<td>5</td>
<td>DEATH</td>
</tr>
</tbody>
</table>

Correlation of control pause and other parameters with alveolar CO₂ and patient health
(Chart explained in bold text below, paragraphs five, six & seven)

---

The Doctor spent the day zig-zagging between the restaurant veranda and the small beach. He managed to slightly calm his frayed nerves by sipping the local wine. When he lay on a recliner to sun himself a little, his head began to spin pleasantly.

It was 29 August... the sixth day of his journey, with only three remaining until his defence. He closed his eyes and lay back on the salt-weathered boards of the wooden recliner. August was almost over. He didn't yet know what this autumn would bring, but it was at this time two years ago that he became completely estranged from Professor Pomekhin.

On 11 November two years ago, Buteyko had presented his Discovery to the Scientific Council of the Siberian Branch of the Soviet Academy of Sciences. Unlike some other such presentations, it was based on more than the over-excitement of the pioneering scientist. Buteyko had seven years of hard work behind him (starting from October 1952), which he had spent gathering proof. He had cured hundreds of patients from asthma, hypertension and angina, and he had created his combine-complexator, which could give a mathematically accurate picture of a patient’s health. Buteyko completed his work on the complexator in Novosibirsk, but he had gathered much of his data in Moscow at the beginning of the 1950s, in his laboratory in Academician Dariev’s department. It was at this time that he had developed the most important components of the complexator.

Buteyko propped himself up on his elbows and looked in the direction of the restaurant veranda. No-one was looking for him yet. He rested his head in the crook of his right arm and mentally returned to November 1960.

How curiously his colleagues had looked at the tables that he hung on the board! They paid especial attention to one where the seventh row down was marked ‘death’ - no-one wants to die.

“Physiological Condition of the Body and Pulmonary Ventilation Criteria according to Dr K Buteyko.” Professor Pomekhin read the heading aloud in a monotone before returning to the chairman’s seat.

“This table allows us to monitor the seven stages in a patient’s progression towards death or to the longest possible healthy longevity, in other words,” here Buteyko gave an embarrassed smile, “by our current modest standards, to virtual immortality.”

Someone in the audience started sniggering and there was muttering at the back. Shikhman, former Head of the Physiological Laboratory, was sitting there.

“I see that some of you don’t believe me when I say that carbon dioxide deficiency is the fundamental cause of many common diseases.” Buteyko was trying to disregard Shikhman’s rudeness, which was, moreover, obviously supported by the chairman. “Let’s take a look at the role of carbon dioxide from a historical biological point of view.”

Buteyko could feel himself becoming tense, and his piercing gaze made Shikhman fall silent...

**Buteyko Breathing Chart: The Bodies Protective Machanisms**
The Bodies Protective Mechanisms:

- Hypertrophic rhinitis
- Nasal congestion
- Laryngospasm
- Bronchial and arterial sclerosis
- Varicose veins
- Adenoids
- Ear hypertrophy
- Bronchial spasm
- Coronary artery spasm
- Biliary tract spasm
- Intestinal spasm
- Vasospasm

Buteyko Breathing Chart: Respiration
Buteyko Breathing Chart: Evolution of the Atmosphere, Respiration in the Human Fetus
Chart: Evolution of the Atmosphere, Respiration in the Human Fetus

Buteyko Breathing Chart: The Effects of Hyperventilation
The Effects of Hyperventilation

1. Decrease in CO2 in the alveoli and the blood.
2. Increased metabolism and metabolic disorders.
3. Bronchial constriction.
4. Constriction of the blood vessels and other smooth muscle.
5. Increased or decreased arterial pressure.
6. Tighter bonding of oxygen to the haemoglobin in the blood.
7. Increased blood cholesterol.
8. Obesity.
9. Increased partially oxidised metabolic products.
10. Tissue damage.
12. Weakness.
13. Headache. *Impaired blood circulation
14. Dizziness. in the brain, stroke and so on.*
15. Insomnia.
16. Irritability.
17. Heart pain, angina pectoris, myocardial infarction
18. Feelings of cold in the extremities, intermittent lameness
19. Decreased efficiency at work.
20. Noise in the ears.

Buteyko Breathing Chart: Asthma Attack

Spirogram upon admission of the patient during an asthma attack and after five minutes of the VEDB (VEDB method - Volitional Elimination of Deep Breathing). The attack was halted.

Diagnosis: bronchial asthma, asthmatic condition for six months, vasomotor rhinitis, drug allergy.

Author: Sergey Altukhov
Thank you to Sergey Altukhov for giving permission to use this excerpt from his books.

Doctor Buteyko's Discovery Trilogy, Russian to English Translation 2009:

Translators:
Text:
Volume 1 Chapter 17, Denise Steele
Volume 1 Chapter 26, Heather Stacey
Volume 1 Chapter 9, Fiona Paterson MA
I have not seen any links since diet, nutritional deficiencies, and other factors can contribute. The links is only approximate. 20 s CP - slightly elevated blood pressure; 15 s - class 2 for US classification, 10 s - severe heart disease.

Two American medical doctors, Robert Kohn and Bertha Cutcher, in their article "Breath holding time in the screening for rehabilitation potential of cardiac patients" (Kohn & Cutcher, 1970) described the testing of more than 100 cardiac patients. It was found that "...an individual unable to hold his breath for at least 20 sec [7 s BHT] is a poor candidate for vocational rehabilitation". Furthermore, "It is now suggested that the determination of the breath-holding time is an effective screening test for rehabilitation potential" (Kohn & Cutcher, 1970).

CHAPTER 25

The most rudimentary practical exercises in VEDB!

Exercise One:

Our main function is breathing
Verigo-Bohr's law
Measuring our maximum pause
What is depth of breathing?
Testing the depth of our breathing
How to be aware of our diaphragm and relax it
Drink hot salty water
Asthmatics can benefit from phlegm
Using the method to unblock our noses
Observing our breathing

No! we won't suffocate or stab you here... That's all lies and rumours put about by Dr Buteyko's enemies in Professor Chervyakovsky's gang. Just stuff and nonsense. A quiet attractive woman in a white coat met the 14 newcomers. She was just back from a flying visit to West Germany and exhausted, but none of the group would have guessed. Her office was rather cramped, and she invited the patients to find seats on either side of the shiny brown table, then in a pleasant voice, quietly welcomed them.

"First of all, Good morning" she said. As usual, elderly women made up a third of the group. Despite their cares, they smiled.

"Secondly – I apologise most sincerely for not starting our course on Monday, as scheduled, but you are due to have 10 lessons and we will hold them on Saturday and Sunday, so you get the complete course. (Another woman in her place would have been panting, because she had almost had to run to the meeting. But Dr Ozertsova suppressed a desire to gulp for breath and undid the top button of the light grey cardigan that was visible at the neck of her coat)

"That's good, because we were a bit worried". A rather chubby woman said, looking over the glasses at the end of her nose.

"My name is Dr Ozertsova" the doctor said smoothing her intricate hair style with both hands and tidying what had come loose in her run, "and I was a patient of Dr Buteyko." Here the men gave her a closer look. There were usually fewer of them in any group and here there were three.

"I have been using the method for five years, and working with it and with patients for four". Here Ozertsova fixed her gaze on a thickset man sitting to the left of the door in a trendy sports jacket with red gussets. She had carried out Buteyko's instructions to the letter: first introduce yourself to the patients, then tell them who you are. 'Patients must know who they are dealing with- then they will trust you' was what Buteyko had advised his trainers at their planning sessions.

"I had a malignant tumour in my breast, and thanks only to Dr Buteyko it dissolved". (Mindful of Buteyko's advice, Ozertsova avoided the word 'cancer'). "And now I stand here before you, when I could well be feet first somewhere completely different". She looked round her patients, carefully and kindly. "I would like to say a couple of words about Dr Buteyko." She always found it easier to talk about him than herself. "We recently celebrated his 68th birthday"

"No spring chicken then..." again from the fat lady in glasses.
"Dr Buteyko made the Discovery of the Century!" Ozertsova held the pause. " Back in
1952 he discovered the cause of bronchial asthma, hyperton, stenocardia and other illnesses, and precisely differentiated metabolic diseases from osteochondrosis to tumours. Sugar diabetes also derives from metabolic disorder – (she emphasised the word 'also'). And Dr Buteyko established that the reason for them all is a shortage of carbon dioxide gas in the pulmonary alveoli.

A moon-faced twelve-year old boy was hanging on her every word. He wore an expensive track suit with white flashes on the shoulder. Ozertsova looked at the group sympathetically: poor unhappy people. What had they been through to find their way here! What hopes had they pinned on this mysterious method.

The first lesson was always the hardest. Buteyko required trainers to give practically all the theory in the first three days and much of it in the very first session (true, just in outline). He gave guidelines but left creative space for the trainers, and since there were no approved printed materials in circulation, each trainer had to devise their own courses. But if any patient failed to master the method, their trainer had to undergo a detailed post mortem in clinical supervision. Each trainer's lessons were recorded, and if any of them distorted or departed from the control tapes approved by the Head of the Centre, appropriate conclusions would be drawn, that could have far-reaching results…

"Where do the lungs get their CO2?" Ozertsova asked and watched the group thoughtfully shrug its shoulders.

"Well maybe…" a girl sitting near her started hesitantly, then dried up. She wore a dog tooth jacket with an ersatz emerald on the lapel.
"What do we need in life more than anything? What is our main function in life? Breathing! " – Ozertsova answered her own question – Breathing is the main function of our bodies, and we pay no attention to it at all. It is free…" -- Dr Ozertsova threw up her hands – "And what comes second after breathing?"
This time there was a deafening silence.

" What do we mostly live off?" She nudged her patients towards the right answer. "Food, my friends. Food. What was so difficult about that…?"

The men huddled nearest the door, laughed quietly.

" We put something in our mouths. We chew. We swallow, and we partly absorb it. Then out blood stream transports this nourishment to our cells" -- Ozertsova depicted a cell with the thumb and index finger of her right hand, for visual effect -- "The basic nourishment of any living organism is Carbon. 'C' on the periodic chart" - she said firmly. –"Just now we inhaled, and at the base of the inhaled air was oxygen. We are always hearing 'take more oxygen, take more oxygen' " -- her lips curled with distaste – "but we inhale air and from this inhaled air oxygen then reaches our blood and is carried further on to our cells, where Carbon combines with Oxygen – C+O2 and Carbon Dioxide is formed. At cell level."
She moved to the black board with a piece of chalk.

"Carbon Dioxide gas is produced in the cells. Is that clear? In the cells".

The girl in the dog tooth jacket nodded.

"It does not come from the atmosphere!"-- Dr Ozertsova drove the point home -- "It is made inside the body". She had to explain this rather complicated physiological process to her patients as simply as possible, because some were not terribly well-educated. Probably experts in this field could accuse her of errors or inaccuracies, but few people could explain things as accessibly as she. Ozertsova had to slip between strictly scientific concepts and ordinary colloquialisms understandable to all -- something that demanded great talent and no little erudition. Not everyone could teach the analysis of matter at university level, which Clara Ozertsova had had to do in her time! It is probably the hardest thing in higher mathematics, so someone with that analytical cast of thought who is minded to teach elementary physiology and has carefully studied the literature, is unlikely to make a hash of it.

Dr Buteyko required trainers to carry out a quick deep breathing experiment with the patients and at the same time to try to convey as much of the theory as possible in the first minutes. Dr Ozertsova toed a line somewhere between. She of course agreed with Buteyko that deep breathing was itself the best proof of the harm it causes patients, especially when it was triggered by a deep breathing experiment. But still, she preferred to do especially deep breathing with people who were at least somewhat aware of its rather serious consequences. Every word she uttered was born of long and diligent work with a large number of sources and, more importantly, the large number of patients who had passed through her hands. It was not so hard to convert people to the Method in a mechanical way, but it was essential they understood why they were doing it. Without a clear understanding of the aim and purpose of what they were trying to do, the patients would make a poor fist of it anyway, and no number of postures and exercises would help them. That is why Dr Ozertsova did not immediately rush to instil shallow breathing in her patients. More haste, less speed as everyone knows.

"Up to 7-8% Carbon Dioxide forms in the cells, but the body contains only 2% Carbon Dioxide." She spoke quietly, as usual, but made sure that they could hear her at the far end of the table, then deliberately paused. Would any of the patients spot the difference in the figures?

"And what do you think?" She opened her eyes wide. "It turns out we lose CO2 when we exhale, although the pulmonary alveoli should contain 6 ½% after all losses, if normal human life is to be sustained.

The norm for a so-called healthy individual had been established by the British scientists Holden and Priestley. Dr Ozertsova's bright shining eyes suddenly clouded.

"And by putting a child on its back, when it is a tiny little scrap of a thing -- Dr Buteyko
calls this the corpse pose which dramatically increases the depth of our breathing. So, deep breathing is inculcated in us with our mothers’ milk."

Dr Ozertsova’s voice betrayed a tragic note, and the fat lady took off her glasses in reaction, sighing deeply as she did so, however….

"The whole of the medical profession, and all the official propaganda we get on breakfast radio and TV exercise programmes day in and day out drills us to breathe deeply. "Deep breath! Deeper!" -- Dr Ozertsova imitated the exercises with her hands above her head – "And as a result, when we exhale we lose an awful lot of CO2, the most valuable thing for our health… and we are left with less than 6 ½% in our pulmonary alveoli."

Dr Ozertsova glanced at her audience sympathetically. They were already left with much less.

"And this is when Verigo-Bohr's law comes into play: Bohr, the father of the famous physicist Nils Bohr. When you breathe deeply it seems that oxygen attaches itself more tightly to the haemoglobin in the blood, and transfer to the cell less easily. The blood has a lot of oxygen but the cells do not. They get the oxygen only if we take shallow breaths."

Ozertsova gave her patients a moment to think.

"Dr Buteyko discovered that deep breathing starves our bodies of CO2". She gave her watch a stealthy glance: oh there was a lot she could still say in the first lesson! It would be like pouring a gallon into a pint pot for the patients. "When we have too little CO2 we disturb our metabolic processes, and this is where all our problems begin. Take osteochondrosis, for example. Which of you would believe that it is directly connected to deep breathing?"

"Osteochondrosis and deep breathing?" The unsmiling man with the beard and sports jacket gave a hacking cough.

"The same with calcium" Ozertsova continued, without answering him. "Say you have damaged a tooth. Your body produces calcium. So what if some of it leaves the body, you would think…But no! Mother Nature thinks otherwise". Dr Ozertsova put her palms together and tilted her head slightly towards her left shoulder. "Calcium is disseminated throughout the whole body and settles in the spine. Then it becomes painful for you to bend and stretch."

The man in the sports jacket moved his bullet head from side to side with difficulty. He was obviously familiar with chondrosis of the neck.

"So what is osteochondrosis?" Dr Ozertsova gave him a sympathetic look as he screwed up his face in pain. "Have you ever seen with your own eyes any tablet or injection that can cure hypertonia or asthma?...
"Never!" one of the women readily agreed, stroking the shoulder of the 12-year-old boy – her son. "What have they not forced into my Misha here, but the asthma he had, he's still got. He's only piled on the pounds…"

"You see!" – Clara Ozertsova raised her head higher "They are no use at all and you can end up taking them years, even though Dr Buteyko discovered that deep breathing was the source of very many illnesses back in 1952, when your Misha was not even a twinkle in his father's eye. Based on his discovery, in 1962 he applied to patent the EDBM, as a cure for Haemohypocarbia.

--"So why do we still not have one?" Misha's mother burst out, visibly upset and straightening an emerald green earring with her hand.

"Because they immediately said Buteyko was mad and tried to poison him!" - Dr Ozertsova gave an eloquent shrug. The patients were astonished and gasped. "That's the health service for you! Either that, or they give all the credit to yoga. They said that all this was well known 2,000 years before Buteyko. But yogis never drew scientific conclusions from what they observed. Nothing ever materialised from what they do! while Dr Buteyko charted all his results to the last hundredth of a percentage point. It was only in 1983 that he received copyright from 1962 – when someone started to write a book about him in the west. Do you realise how many kiddies, like your Misha here, died during that time?"

-- "They should be hauled up before court!!" Misha's imposing mother stamped her foot.

"And it was literally only last year that Dr Buteyko got a patent for this chart on the criteria for pulmonary ventilation." Ozertsova took a pointer and touched a seven-step chart, identifying the volume of Carbon Dioxide gas in the body of a healthy person and gradual deviations from the norm by stages. "We define the depth of breathing – roughly of course – by the length of our pause. That is, by stopping our breath after a normal exhalation. When you were children, did most of you have to practise diving?"

The patients nodded.

"Well now you are a bit older, you don't have to dive so often" – Dr Ozertsova smiled—" but you should still remember, if you dive in when you are inhaling, you will probably damage your lungs. You should dive in only when you are breathing out. At the end of your exhalation. Do you all know what inhalation and exhalation are? Perfect! We can measure our own breathing, by measuring the pause at the end of our exhalation. We can pretty well identify the start of our inhalation ourselves, and the middle, but to measure the end, we must hold the end of our nose."

With the thumb and index finger of her left hand, Dr Ozertsova, squeezed the tip of her nose.
"We are going to measure what is called the "maximum pause" – which we measure by holding the breath at the end of an exhalation until it causes extreme discomfort – but not until our temples throb, or we turn blue and blotchy" she cautioned quietly. Hold your breath until the stage of extreme discomfort, but not so that you open your mouth when the pause ends. Don't start gulping air. "She opened her mouth wide and made a few gulping motions.

This was a ticklish point. Ozertsova spoke about the maximum pause but just a year ago, many trainers including her, had taken courses that radically departed from the control pause! Ie courses that held the breath at the end of an exhalation until the first faintest sense of discomfort, and not until the stage of extreme discomfort. And a couple of years ago the table of pulmonary ventilations had also been slightly different, with a vertical column denoting this control point.

But experience had shown that not every trainer was able to explain in an accessible way exactly how to measure the control pause itself. The patients got confused and gave contradictory readings, so Dr Buteyko had decided to remove the notion of a control pause from accepted currency, and leave just the maximum pause. It was much harder for patients to confuse it. It is harder to mistake a feeling of extreme discomfort than to mistake its very faintest onset. Just now the onset of slight discomfort happened after ten seconds, and a bit later, seemingly after fourteen...

And the chart had been re-drawn! And the people who had been at Dr Ozertsova's classes eighteen months before looked at her wide-eyed. It had been drummed into them that for an absolutely healthy person the control pause was sixty seconds, and the maximum pause - 90. Now, the relatively unattainable threshold of good health had apparently dropped by 30 seconds. The new table had a column only for "one maximum pause" and the norm for the healthy person was again identified at sixty seconds. For veterans of the Method who were unaware of Dr Buteyko's latest instructions on replacing the intangible CP with the more obvious MP, this seemed a little strange.

The new ones thought nothing of it, being oblivious to the history, but Dr Ozertsova always had to overcome an inner reservation at this point. She had always known how to explain to patients how to measure their control pauses directly! The fact that she was practically forbidden to mention it now, except in passing, irritated her greatly. But still, she had to "teach all of Dr Buteyko's precepts", even if they sometimes definitely irked her. If he said that's how this must be taught, that was how Dr Ozertsova taught it. And that was why everyone strove to join her courses, because they were the only place where you could hear the latest version of the Buteyko Method, in its continually evolving form, complete with authorial modifications. She taught it without any adulteration or deviations, which was in itself rare, because many trainers tried to present separate sections of the course in a way that was especially their own – perhaps from 'imperialist' ambition. Sometimes they made useful additions, but more of than not, they were unnecessary and distorted the author's original intentions. Buteyko did not rein in creative types, or put them under any psychological pressure, but he did try to extirpate heresy with the force of tempered steel, if he spied it in any unsuccessful 'innovations'. Dr.
Ozertsova was an utterly safe pair of hands, and though he was not particularly choosy about the titles he bestowed on his acolytes, he inscribed a present to her with the words: "for the best trainer in the USSR", and he was not wrong.

Clara Ozertsova did not succumb to this flattery. The doctor was generous with his honorary titles and she suspected that other favourites had received similar inscriptions from him (and she was right). She kept quiet about the dedication on the present, aware that otherwise she might provoke the envy and hostility of colleagues whose moral outlook was quite close to hers.

Her patients, knew nothing about the inscription but just felt instinctively that she was the trainer they had to sign up with. And sign up they did. When later some of her colleagues told her she should "not deceive the patients, and so on and so forth", Ozertsova begged to differ, crossed herself and said a prayer, but there was no falling off in numbers for her classes.

"No, no, you've been holding it too long!" She stopped the stumpy little man in the blue sports jacket and red gussets. "You shouldn't hold your breath until you feel ill..." Dr Ozertsova turned to face all her patients, troubled. "Some people think you should immediately hold your breath to the sixty second limit"—and here her pointer touched the middle row of the chart of criteria for pulmonary ventilations, marked 'Norm'. "That is incorrect!"

Ozertsova smiled kindly at her patients, as they dropped their tired shoulders. There was something confidential in her manner, as though they were little children and she felt sorry for them. "There is no need to force yourselves."

"My daughter Zinochka has started a temperature, so I didn't dare bring her to class". This came unexpectedly from the young woman in the dog tooth jacket and the ersatz emerald on her lapel.

"I shall drop in on you both tomorrow" Ozertosova assured her.

"So, how can we determine our CO2 content?" she continued, again reaching for the plastic pointer "This is how! By looking at the chart of criteria for pulmonary ventilation. If your pause is 60 seconds long, then you have 6 1/2% CO2 in your pulmonary alveoli. If your pause lasts five seconds, you have 3 ½% and you are at death's door.

The patients all cringed: they all had quite a long way to go to reach 60 seconds, and five was an awful lot closer.

"I have a stopwatch here in my hand "Dr Ozertsova held it up "and I will start it. When I say get ready to measure your pause — just make a note of that moment, but do not measure your breathing! This is just so that you recognise the pause from which you started your coursework. Let the concept of a pause just settle in your heads right now, and meanwhile we will count your pulse."
In measuring their pulse and pauses with the aid of a stop watch, Dr Ozertsova rather deviated from Dr Buteyko's strictures (and, coincidentally, the strictures of other trainers) that patients should not be shown a stop watch. The seconds should be measured off at the trainer's count. Sometimes Ozertsova did this, by just counting aloud, but, being a mathematician, she always found these verbal counts too imprecise.

"Our pulse is the shuddering of the arterial wall" she explained. "Take three fingers and, without applying any pressure, put them on this part of your hand to measure your pulse rate. On the hollow behind your thumb, between the bone and the tendon, or on your temple. You can grip with your fingers underneath your arm, to help you count better".

With her left hand she gripped her right one, just above the wrist.

"A good pulse rate is 60 or 70 to the minute. The maximum permissible for a man is up to 80; for a woman, up to 85. Any higher is worse. So now, get ready! "

Dr Ozertsova waited for them all to locate their pulse.

"Go!" and she started the stopwatch. An intent silence descended on the room for a short while. "And now we will write down what results we got" Ozertsova clicked the stopwatch off again.

"I reached 108" The fat lady in the red cardigan could not believe it and pushed her glasses down to the very end of her retroussé nose.

"Did you multiply it by two?" Ozertsova asked her. "Because we only timed 30 seconds".

--"Well, yes" Her patient looked at her askance. It seemed no doctor had ever told her how to do this before.

"Have you got asthma?" Dr Ozertsova glanced through her preliminary case notes.

--"Yes. I took one Predni-Zolon tablet at home today, but I haven't taken one for 10 years now".

"Have you ever been in intensive care?" Ozertsova reached for her biro. "And were you on a drip?"

--"I've never been in intensive care, but I did have a drip", the fat old lady said rather uncertainly, as if she was trying to remember.

"You see, colleagues" - Ozertsova a note to herself – "Outwardly this is asthma, but a high pulse like this and tachycardia, suggest a hormone shortage. Today, as soon as the lesson is over, we shall all go to the doctor for a medical. There I shall get to know each of you in detail. Yesterday you could not have a medical because I was still away, but we
have a rule her: the trainer and a doctor examine the group. And as for hormones" -- she continued her train of thought – we take the following position. You should look on a hormone as a friend. Yes, yes!" – Dr Ozertsova noticed a look of disbelief on several faces – "Hormones frighten a lot of you, but you should know that a hormone shortage can lead to heart problems. Tachycardia follows, and so you should N-E-V-E-R stop hormone treatment abruptly!" – Ozertsova spelled it out – "And a hormone surplus leads to atrophied veins.

Tomorrow I shall tell you more about this! And did any of you have a pulse rate lower than 60?"

"I do, Mine's 58". A fifty-year-old man who was going prematurely grey, raised his hand. A warm flannel shirt showed at the open neck of his pale grey linen suit. He was sitting with his wife, a dark red head, to the right of Dr Ozertsova, at the doorway.

"Well, we know all about you" – Dr Ozertsova again glanced at the exercise book – You are a trainer here on a refresher course. You are chosen by God, as they say ”—and here she gave a significant laugh --. "Now I will show you all how to measure your pulse." -- Dr Ozertsova gathered herself for a moment – "and how to hold your nose, and when to let go of it, without opening your mouth!"

She calmly lifted her right hand to her nose and on an exhalation that was audible to no one, she pressed the tip of it between her thumb and index fingers.

The patients lost count as they observed. Those whose watch had a second hand noticed it was going round again, but Dr Ozertsova still held her nose. For anyone seeing her for the first time, it was all too much. Those who had sat next to her at the conference in Crimea in late September 1988 knew very well that she had maintained her pause longer than anyone else in the hall. A trainer from Odessa had set a record of 125 seconds, but on the verge of absolute collapse, while the unknown Clara Ozertsova, had maintained her pause for 128 seconds with energy to spare, sitting at one end of the balcony and modestly holding her peace.

Today she had no intention of setting any records. Her late flight and the run to the lecture room had taken its toll. But she still removed her hand, completely calm, at a count of 88, without a flicker of a facial muscle.

"Terrific!" 12-year-old Misha was as sincerely happy for his trainer as if he had done it himself.

"How long can Dr Buteyko manage?" the boy's mother asked from behind her, holding his sleeve.

"At planning meetings he can hold a pause of 188 seconds completely calmly" Dr Ozertsova said, proudly. "But you and I don't need to be breaking any records. Hold your pause just as long as you can avoid gulping for breath and opening your mouth. I am now
going to start the stopwatch. You are not obliged to start counting from the moment I start it – start from any moment you choose. I repeat, just now we are determining our maximum pause. The maximum pause involves holding your breath to the end of an exhalation until you reach significant discomfort, but still do not open your mouth afterwards. We are measuring our maximum pause. Everyone begin at any time. Get ready…"

Again, everyone heard the click of the stopwatch.

"Go! One, two three…eight, ten." At a count of 14, several people started letting go of their noses, one by one. At a count of 24, almost all had given up – except for the trainer in the flannel shirt and the overweight woman with asthma, whose pulse had measured 108 that day. She triumphantly held her nose to a count of 47, conceding victory only to the grey haired trainer. No one could match him…

Well done, of course" Dr Ozertsova cheered the asthmatic record-breaker, suddenly serious " But you obviously over-held your pause. You see how your chest is working like a runner's, and your lips are slightly open. So that was still not your maximum pause, but your over-extended pause".

The other patients immediately started smiling. No one wanted to be twice as ill as this old woman, with her tachycardia.

"Everyone write down how many seconds you held your breath " The group was momentarily distracted and Dr Ozertsova reminded them again. Did they not tell you in the office about an exercise book and a diary? I'll tell you all about them tomorrow.

"My pulse was 68 but my pause was only eight seconds". The young woman in the dogtooth jacket with the green brooch on her lapel sounded disillusioned.

"Well, from this table you can determine which of you is nearer super tolerance" Dr Ozertsova said, turning once again to the table on Criteria of Pulmonary Ventilations. The patients sitting in the office were obviously far from super-tolerance, since nearly all of them had stopped holding their noses at a count of 24, which meant that none had reached even Stage Three of emerging from a state of disease, and even the old lady with asthma could not dream of Stage Seven, above the horizontal row, which was marked 'the norm'.

Let's take a look at the chart" – Dr Ozertsova smoothed one upturned corner – "Have a think: whose pause is longer? Someone with a reserve of oxygen in their cells has a longer pause. And why do they have a larger reserve?" Ozertsova tried to make the patients think and not sit like stuffed dummies. "Yes, because they must breathe less deeply! Dr Buteyko shows the correlation between pauses and CO2 on his table in percentages, and each conceals a reserve of oxygen. I have had patients here who said "we take shallow breaths, but we are still ill"… Ozertsova paused for a second. "I measure their pause, and what do you think?" A faint pursing of her lips. " One of them
had a pause of only 15 seconds ie the CO2 content of their pulmonary alveoli was less than 4 ½% against a norm of 6 ½%! She spread her hands eloquently. "Did he really take shallow breaths?"

Judge for yourselves". Dr Ozertsova ran the pointer along the horizontal row on the chart. "If Buteyko's chart says the norm for a pause is 60 seconds and someone's pause is only 15 seconds, what is the depth of his breathing? The formula is to divide 60 seconds by his maximum pause – ie by 15 seconds – then multiply by 100. We get 400%. If someone's breathing is four times deeper than the norm, can he really say that he takes shallow breaths?

Of course not! If your pause was 100 seconds as against a norm of 60, then that really would be shallow breathing." She tapped the heel of the pointer on table's polished surface.

The patients held their tongues, on guard. For any of them a 100-second pause was like reaching for the stars.

"After the class, everyone should write down in their diary the depth of their breathing. You can work it out now according to the formula." She waited for them to do the simple calculations, then got their attention with a gesture. "And now, I would like to show you the damage done by deep breathing." She half lowered the blind at the window, if only to cover the burning radiators just a little. This was always a very serious moment in the first lesson: the so-called deep breathing test. Dr Buteyko often used to say that a well-conducted test was a better advert for the Method than any number of slogans and threats. This was understandable. However much you try to convince a patient that deep breathing is harmful, no matter how much supporting evidence you produce in theory, if you don't allow them to feel the damage inflicted on their own body, all your arguments are a waste of breath.

"What do you think?" -- Dr Ozertsova took an unhurried look around the group huddled in the small office -- "Where will your breathing be deeper? In an office like this, where everyone is exhaling CO2 " – she pointed at the walls plastered with charts and diagrams – " or out in the fresh air?"

"In the office". the woman with the green brooch said, after some hesitation.

"Good girl! " Pleased, Ozertsova nodded at her. "We do not inhale CO2. We have to process it. It is better to be out on the street, walking. Right, now we will conduct a little deep breathing test. We are going to specially and deliberately breathe as deeply as we can, but not all of us at once. In groups. We will divide up like this -- one group to my left and one to my right, and we will all start by hiding together."

Her patients' gaze was suspicious.

"Yes, yes – do you not know how to hide? We will hide and listen to our own
breathing, and see if it has got better or worse."

"It's not worse. I think my head even feels a bit better" Misha's mother said at once.

"Good. Now we will try breathing deeply in groups. First the left group, then the right one. Observe if your pulse speeds up. The frequency of the beats – the extrasistolic effect. Do not take your pulse exactly, just touch the pulse on your wrist, and count your inhalations, and memorise what symptoms you experience at what count of your inhalations. For now just jot this down on a piece of paper and when you get home, put it in your diary. "Group on my left – start!"

The patients cautiously began to breathe more deeply, but not immediately and not all at once. Each of them evidently had a subconscious and deep-seated terror of breathing deeply…

--" My pulse disappeared on the second inhalation! " A woman in a brown dress with a cream scarf thrown over the shoulder said, from her seat next to the fat asthmatic lady. "And my heart feels odd". She lifted a hand to her chest. " And it's got to my polyarthritis. My legs are killing me."

"You should stop!" Dr Ozertsova said at once. "Write it all down for your record."

--"My head started swimming on the 10th inhalation" said a skinny sixteen-year-old boy near the window, cautiously holding his cropped blond head.

" The blood vessels in your head are in spasm" Dr Ozertsova turned to him. "Try making your breathing less deep and see if your head stops spinning".

"I've no reaction at all…" the asthmatic lady insisted, who had already clocked a pulse rate of 108 before the exercise.

"You have already used your inhaler today, so you need to inhale more energetically". Dr Ozertsova parried, from her wealth of experience.

--"Now it's worse", the lady admitted.

In the team on the right, the woman with hypertonia soon got a head ache. The obese man in the white western tie, felt his temples hammering. The girl with short hair next to him felt her pulse rate double, even though she had apparently inhaled a Birotek hormone preparation before the class.

"Anyone who has taken medicine today should bear in mind that it might mask the effects of the deep breathing experiment on you." – Dr Ozertsova warned. Young Misha felt an unpleasant stabbing pain in his forehead, near the bridge of his nose.

Dr Ozertsova began wrapping up. "Well, have you seen for yourself? Deep breathing
brings on a headache in some people. That is to say that the body reacts to the loss of CO2 with spasms in the cerebral blood vessels. Other people feel it first in their coronary system. I have a group of patients in the institute at the moment with sugar diabetes, and they have to pass through the functional diagnosis office, to measure their vital pulmonary capacity and so on". Clara Ozertsova squinted slightly." And the diabetics flatly refuse to visit the office, because they are made to take deep breaths and immediately start to feel lousy! Dr Buteyko even rang and specially asked they be spared deep breathing… Right, have you all taken deep breaths?"

Dr Ozertsova stole a glance at the time.

"My toes have gone numb" a slender girl in an elegant white jacket said with amazement.

"Deep breathing throws the arterial vessels into spasm and expands the blood vessels. The venous blood stagnates and your varicose veins have evidently distended." Dr Ozertsova immediately explained.

"Yes they have…" the thin girl confirmed, with a blush.

"A man came for training who had gangrene of the feet "—Dr Ozertsova again began reminiscing —"and when he breathed deeply his legs turned dark blue. The Polyclinic suggested amputating both at the knee".

At this the girl in the white jacket winced.

"But Dr Buteyko's method helps diagnose people with these kinds of illnesses too. The man took some breaths and it was evident that if anything at all needed to be amputated it was only the part that had turned irreparably blue-black. Dr Buteyko's method warms and calms, and takes away pain."

Dr Ozertsova said this with feeling.

"In the most literal sense, each of you is learning to be the doctor of your own body, and the 10 days we will spend working together are not a course of treatment, but a course of EDUCATION." She laid emphasis on the last word. You are curing yourselves. That is the service you are doing for yourselves. If you want to be cured, normalise your breathing!"

She noticed that even the most stubborn had now stopped breathing deeply, and so paused.

"Hands up anyone who did not feel ANY symptoms while they were breathing deeply".

No hands went up, but Ozertsova knew from experience that there were bashful patients in every group, who didn't put up their hands when they should.
"If someone did not experience any symptoms or is not sure that they did, please repeat the exercise at home," she suggested, just to be sure.

"Remember that nothing helps you as surely as the Method! I remember when I was at a conference in Moscow in the autumn of 1988. I heard an amazing confession from an experienced acupuncturist from Krasnoyarsk. He had been treating a little girl in the throes of an asthma attack, but could do nothing to allay it even with all his needles. In the end he took them all out, but first he asked her to breathe deeply, and what do you think happened?" Ozertsova spread her hands in amazement. "She began to deteriorate again, with the needles still in her!

And that acupuncturist said: 'I kneel before Dr Buteyko, because his Method allays any attack within minutes'. Dr Ozertsova often recalled this example. The acupuncturist had been astonished by Buteyko's Discovery and had pinned a gold needle to his lapel, in recognition of the king of complementary practitioners. That scene was seared in her memory.

"Now we are going to listen to our breathing." – Ozertsova passed on to the next item in this complicated first lesson – "I will give you commands, and you will observe what happens to your breathing, after each one of them. Command No 1" – Ozertsova noticed that the patients had immediately mobilised themselves, even without meaning to.

"Sit comfortably" – she told them quietly – "see how quiet it is!" – she said, affecting surprise. "Have you started to breathe less?" Yes? This means that the actual comfort of the posture DECREASES the breathing. Let us sit with good posture, which means sitting with our shoulder blades flat and smooth behind our backs.

First of all. you can get up on your feet, with your shoulder blades in and your shoulders back. Stretch your belly with both hands so you can feel it pulling your stomach, which should be drawn in anyway. And sit down with this stomach in an alert state of tautness." Ozertsova look to see how accurately her patients were following her practical advice."And now let go of your belly."

Stay in the posture. Let us maintain the curve of the spine. Sit down without touching the chair back – the way well-bred girls once sat. Before, we were transferring the whole weight of our bodies onto our spine, but now we shall give it a rest. We can slouch and Stoop, but the spinal column should fit into a dip, a hole, in the muscular corset, to be weight-bearing. Otherwise we shall lose tone. That is the second factor of good posture: when your shoulder blades do not stick out behind your back, and you can finally relax all the muscles that are not needed for breathing, and MOST OF ALL, when you can relax the diaphragm, that separates the breast from the abdominal cavities." Dr Ozertsova raised her voice a little as she said this. "Somehow you need to try to feel it, although you obviously can't grip it with your fingers…"

Dr Ozertsova gave an understanding smile. This was the crux of the first lesson. Telling
the patients HOW they could come to know their own diaphragm and learn to master it, was something that only one in a million trainers could do…

"You can't touch it or feel it, and we can't control it! Just the way we can't control the temperature of our bodies or our blood pressure…" one very experienced trainer had announced at one of the planning sessions with Dr Buteyko. And no one contradicted him, because explaining how to control one's own diaphragm was devilishly hard! The only person who objected at the time was Clara Ozertsova.

"Have any of you ever had hiccoughs?" She turned to her class, who sensed the trickiness of the issue. "When we hiccough, our diaphragm starts going into spasm, and we feel our abdomen jerk, a jerking that is caused by contractions of the diaphragm. But we need to relax all the muscles of the diaphragm." Dr Ozertsova extended her right hand in front of her, and asked: "What do you think – is my hand tensed at the moment or relaxed? Her face was care free and did not betray the slightest bit of tension.

--"It's relaxed". One of the patients fell for the calm look.

"Wrong!" Dr Ozertsova parried firmly. "If my outstretched hand was completely relaxed at the moment it would have dropped – like this", and she allowed her hand to flop onto her breast. "This is exactly how we should relax our abdomen. Let us all sit comfortably, with good posture, and let us relax everything we can – our stomachs first of all, and our diaphragms will relax along with other muscles. The diaphragm is also a muscle, in point of fact, that divides our abdominal and breast cavities. Do not cross your arms on your knees!" – she warned the fat asthmatic lady in the glasses, who had put her palms on opposite plump knees – "and there is no need to turn your palms upwards, because that just sets up unnecessary tension which transmits to the collarbone area, and thence to the diaphragm.

Let us all sit comfortably, with good posture " – in the first lesson she repeated these phrases many times. She had to, so they were literally carved into her patients' grey matter. Later she could dot the I's and cross the t's, but for the moment…. "Relax your abdomen, relax your chest, and relax everything inside. Let us listen to our breathing. What do you feel?"

--"My breathing has got smaller" one of the patients said, rather ineptly, while struggling to keep her good posture.

"You see! And we haven't intervened directly in the breathing process yet" – Dr Ozertsova was triumphant. "The third command, or rather the third factor that will reduce the depth of breathing is rolling our eyes upwards."Dr Ozertsova rolled her eyes to the ceiling. "Pupils up, as far as they will go, but head still " she put the palm of her hand on the head of the young man nearest her, as it began tilting upwards. "You should roll your eyes until it is excruciatingly painful - because pain also reduces the depth of the breathing… What happened to your breath after you lifted your eyes?"

--"It went down" the teenager said, now training his head to look straight in front of
"The fourth command, or the fourth thing that reduces the depth of breathing, is keeping your feet beneath you. We are sitting here on chairs, but Dr Buteyko always threatens to throw them out" Ozertsova tapped the chair back with her pointer. "We can sit in various ways. I invite you to sit on the table edge right now and dangle your legs beneath you. You can cross them at the ankle, but I beg of you, don't fling one leg over the other! Relax. At home you can practise kneeling, and if your knees get tired you can lean back on your heels."

The elderly fat asthmatic looked at her legs doubtfully.

"There are also a number of oriental postures" – Dr Ozertsova turned up the heat – "The lotus and the half-lotus. You can try them all at home… Dr Buteyko says it is actually better to do them on the floor"

The elderly asthmatic silently pursed dry lips. She obviously found the floor no better than a comfortable chair.

"The fifth command, or the fifth thing that naturally reduces the depth of breathing is puckering your mouth like a trumpeter." Dr Ozertsova extended her lips in a small embrachure. "There are some sacred Buddhist sounds, for example: the OHM. When you chant this, put your lips in a trumpet shape. Relax the root of your tongue and your breathing will again become shallower. Now, let's all try together". Ozertsova gave a little clap. "Let's all sit comfortably, with good posture, and our feet beneath us. Don't cross your legs, but think, or say "OHM". She straightened the teenager's slouching back. "Put your lips in a trumpet shape, and relax the root of your tongue. Now everyone can assess their breathing".

"Sitting like this, I don't seem to inhale at all. I can only exhale…". The patient in the brown dress smiled weakly. It was she whose pulse rate had vanished during the deep breathing and whose heart had hurt.

"Well in the far north east you don't need much explanation. All you need say is "Tynema" and they all immediately get it." Dr Ozertsova smiled back, pleased with the effect. "They have this very expressive term which means not breathing, or almost not breathing."

-"Well that's Yakutiya! In cold like that you don't feel like breathing", the fat old asthmatic lady grinned. "You don't have to spell it out in words of one syllable for us."

"Just now I have given you the five finger rule of my right hand". Ozertsova spread the fingers of her right hand over her head. "It tells you how to reduce the depth of your breathing, without actually interfering with the breath. The right hand " – here Dr Ozertsova clenched and spread her fingers. "How do we reduce the depth of our breathing? Well, firstly by adopting a comfortable pose" – she again started to repeat.
"When I first adopted the Method after they discovered my tumour, I tried everything. I sat down. I walked about. But Dr Buteyko said to me, if I wanted to live I had to take shallow breaths 24/7 and I had to under-feed myself". She gave the patients time to think themselves into it. "To under-breathe for twenty four hours a day, and to be in a permanent state of semi- hunger. Dr Buteyko was against plain fasting.

And I did it! "Clara Ozertsova gave her head such a decisive toss, that she needed to fix strands of hair gain.

"Before then I had attended only a few of Dr Buteyko's rare unofficial public lectures in the town. Yes, I revelled in how people could reduce the depth of their breathing.

Second finger" – she bent and straightened her index finger - "is to have good posture
Third - eyeballs upwards
Fourth - Feet beneath you
Five - Lips like a trumpet (and the sounds of OHM)

This is the rule for reducing the depth of breathing by natural means. I beg you "— Ozertsova glanced at the patients who were hanging on her every word – " literally from Day One to get rid of your symptoms by the use of this method.

Let us for instance, take a headache. Or a pain in the heart" Ozertsova tried to speak as slowly as possible. "How can we get rid of them? By the rule of the left hand! Particularly if we observe the first two stages: sitting comfortably and relaxing".

Ozertsova propped herself on the edge of the chair, and seemed to fall sti

"This is how we can get rid of all symptoms – by relaxing. And we can help ourselves with one more thing: adding cooking salt to our intake of fluids. Sodium Chloride. Drink salty boiled water."

This was another watershed moment in the first lesson: overcoming the prejudice that doctors had instilled in patients against salt. Clara Ozertsova saw that some patients were on the point of protesting, and said:

"When I came to the Method, like you I hardly ate any salt. But Dr Buteyko insists that cancer literally cleaves to patients who do not eat any."— the fingers of Ozertsova's right hand curled into a fist. "Add a third of a teaspoon to a glass of hot water, allow it to cool, then sip, don't drain it."

--"Is that just any salt?" Misha's mother asked, jotting in her note book.
"Quarried salt is best" Dr Ozertsova said after some thought. "In the West you can buy sea salt without additives (she was remembering Germany). It is best to use the dirtiest, crudest rock salt, and drink it in small quantities as the need arises. When you want to drink it. Listen to your bodies. Salt water makes some people vomit " – she noticed the stooped woman half way down the table colour – " in which case you can use pure chalk
powder instead – but not school chalk because that has glue additives. Or tooth powder. No more than two teaspoons a day, and one for a child, otherwise lumps can form in the stomach. Do not dissolve it in water. Put it in your mouth, chew it, then sip. Best of all, of course, is white clay powder. You can get it at the chemist’s. All this is very good for headaches. And if any of you are feeling ill, purge your stomach with a salt laxative” – Dr Ozertsova advised from the heart – "one tablespoon to half a glass of water: natural mineral salt etc. Or give yourself an enema, and drink salted water. If you have hypertonia, don't be afraid!"

She looked straight at the colonel with the red face and decorations at the end of the table, who kept holding his head.

"Drink salted water if you have a head ache. Ring me at home any time, if you are afraid. You have my number.

I began by talking about headaches " – Dr Ozertsova continued after a short pause – "But I might really have started by saying that from now on you should breathe only through your nose. Try not to use nose drops, at least during the day” – she added, noticing several patients wrestling with handkerchiefs as she spoke. "Help yourself decongest, by giving your nose a break. Take Misha, for example. He has held his nose, now let him run around as much as he wants like a normal child." She pointed at the 12-year-old asthmatic.

"An elderly person can simply measure their pause in the interval, when they are sitting down. And if you have just caught a virus and your nose is running” – Ozertsova mimed blowing her nose – "Mobilise yourself right now to take shallower breaths! Give your nose a break. Inaudible breathing between pauses, in the lion pose…”

The patients exchanged glances. What the hell was that? Dr Ozertsova explained:

" Open your mouth wide and stick your tongue out to the tip of your chin. You can even squat on your heels and growl … just don't try pulling your tongue with your fingers, like one patient of mine did " Dr Ozertsova warned.

"Take pills only as a very last resort! And another thing – coughing is deep breathing, and this is particularly relevant to asthmatics" -- the doctor turned to the fat lady in glasses – "Who try to cough up their phlegm. Remember – phlegm is good for you! It encompasses everything inside you and protects the bronchia from damage! In extreme cases, you can cough up your phlegm quietly after you have done some shallow breathing, after it has done its job – but not earlier! In cases like that you can put your feet and hands in hot water and massage the trapezius – the hollow here, in the chest, a bit higher than the collar bone. Massage it above and below with your fingers. Massage the whole collarbone area". Ozertsova massaged the neck and shoulders of the lady with asthma.

"Medicine can at least help asthma a little bit, but there is virtually nothing for bronchitis. Therefore, it is virtually the same remedy for shortness of breathe and coughing – make
use of the pause! When a coughing fit literally erupts from you and no reduction in the
depth of your breathing helps, you can simply pause – i.e. stop breathing for a moment,
or cough with your mouth closed. But hypertonics need to be careful about their use of
pausing, if they have thrombophlebitis, or ischemic heart disease. They should not pause
too often, and they certainly should not hold their pause for too long!"

Dr Ozertsova's good natured face suddenly looked very concerned.

"So, you decongest your nose by giving it a break". Ozertsova squeezed her nose and
marked time on the spot. "You just need to take one deep breath, and you are back to
square one. And, what happens if you didn't manage to decongest your nose with one
pause? – Then you must count at least three maximum pauses before trying again, and
no sooner! Have you all got that? If your pause is 20 seconds, the interval before your
next one should be 60 seconds."

She devoted time to this blasted nasal decongestion with good reason, because no one
with a blocked nose could do the exercises. You will not accumulate CO2 with your
mouth open, even if you go blue in the face. And breathing freely through the nose was
the absolute sine qua non for success in the later exercises, although not all patients
achieved it. Clara Ozertsova carried on giving practical tips for banishing symptoms

"Let's say you have a pain in your heart. You have sat down in a comfortable position and
relaxed" – She pulled her shoulders further back – "and if you were not able to relax, you
have drunk some salted water. And what if you get a coughing fit? Then count your
pause and get into the lion position. Massage you xxx and all the collarbone area, and put
your hands and feet in hot water." She gave a quick recapitulation.

--"What if your joints hurt?" The arthritic patient in the brown cardigan identified her
symptom.

"Then do not massage the area under your knees, where there is a concentration of
nerves" Dr Ozertsova warned her. "But you can massage the knee joint itself and if your
kidneys, liver and gall bladder hurt you can use the Right Hand Rule unequivocally: hide,
and drink salted water. If it is your liver that hurts, add some black pepper to the salted
water, if you are not allergic to it! Let's say, it does not give asthmatics more coughing.

Tomorrow I will test you on some of the material we have been through". Clara
Ozertsova indicated that their lesson was coming to an end. "If you are not coming to the
class, phone me. Right now I will collect all your questionnaires. Have you all included
your name and address? I have probably tired you all out today."

She felt a bit sorry for her patients, now choc-full of new information.

"Follow the principle of reasonable asceticism: shallow breaths, no over-eating, no over-
sleeping, and not too much sex. You will immediately feel better."
"What do you mean about eating?" The fat lady with asthma took her glasses off. It was an important question for her. Dr Ozertsova clammed up.

"We are going to talk about that later, but basically you should eat less meat, and measure your pause before and after eating. Food that is vegetable makes you breathe less deeply than food that is animal – for example, meat, eggs and cheese. You shouldn't eat too much of them.

You need to chew more often, from 40 to 100 times per mouthful, and patients with gastritis should drink water 10 minutes before eating."

--"How should we exercise?" Misha's mother interrupted.

"You are not at the stage of exercising!" Dr Ozertsova waved away the question with both hands. Dr Buteyko strictly forbade any continual exercises until patients had properly learned how to get rid of their unpleasant symptoms. But Clara Ozertsova felt a little awkward when people asked, because a year ago there used to be periodic exercising right from the first class, the way there used to be a 'control pause'. After all, there were only 10 classes to the course!

But Dr Buteyko had decreed an end to both, at one of their planning sessions. He said that in the early days, when he allowed his trainers to give patients a continual exercise programme, he had asked too much and he had been stupid. People got tired just learning to take shallow breaths all the time. They tensed up and this produced symptoms of disease again, which made them chuck in the Method. When they were exercising day and night they felt even worse than before they took the course. It was a different thing when they had mobilised themselves to use shallow breathing with the onset of something specific – like an asthma attack or a coughing fit, or a head ache or a pain in the heart. They could quickly get rid of the symptoms with the Method and had no time to tire. And how often they got rid of them thanks to Dr Buteyko and his Discovery! When they were continuously exercising from early on, patients generally gave up the Method and cursed Dr Buteyko and his trainers. Only a select few patients should go on to continuous exercising. Only the most diligent, and then not from the start!

Dr Buteyko had decreed, and they could only do what he said. Dr Ozertsova did so, but deep down something in her still protested. To her way of thinking, teaching the Method just for symptom-eradication undermined half the value of the discovery of illnesses associated with deep breathing. If you gave patients the task of reducing the onset of attacks, instead of reorganising the depth of their breathing – they would only get half better… She herself had recovered from cancer only by continuous daily exercises! She had had practically no symptoms, and her malignant tumour gave her practically no symptoms! So, for these reasons she had a heavy heart when she carried out Dr Buteyko's strictures.

"For the time being, try to listen to your breathing. Find the position that is most comfortable for you: on a chair or on the floor".
She didn't use to end on this note. Not like this! But now…

"Each of you should study the Right Hand Rule carefully, and choose your favourite 'finger'. For some of you it will be the comfortable position, and for some of you the good posture. Others of you might find the eye-rolling a particular help."

Dr Ozertsova once again showed how to roll your eyes up to the ceiling.

"Try to grasp and sense in which organ or muscles you really feel your breathing. I know trainers who feel it with their skin, and others in their thighs. But they are exceptional. Usually it is the nasal passages, the chest or the stomach - but study it all closely yourself. Don't be blind slaves to orthodox medicine, because what does it tell you? Why do asthmatics fall ill? Because, it says, their lungs are weak… Not a word about deep breathing! Why do people with hypertonia fall ill? Because they've got poor blood vessels, or so they say. And diabetics? Because, they say, their pancreas is weak - and they put the poor souls on insulin! If someone went on insulin before they were 40, that's how they will stay till the end of their days. Whoever was lucky enough to start after 40, will get away with pills.

--"I've got latent sugar diabetes", said the woman with the pulse rate a steady 58. "As soon as I want to eat, I feel lousy." Clara Ozertsova leant towards her.

"This is another good example! In cases like this, even if you are taking small quantities of food you should be careful not to overeat. Dry some slices of brown bread and carry them around with you. When you start to feel exhausted, pop one in your mouth. Let it soften in your saliva.

If you get something a bit wrong somewhere, don't be afraid. It's a process of trial and error and you will learn by your mistakes. Analyse them."

--"I often suffer from raging thirst " the arthritic woman in the brown dress said, and even rose to her feet. "And the sugar level in my blood is only a little above normal. I have already retired and am making ends meet as a cloakroom attendant here at the clinic. But not one doctor can tell me definitely what is wrong". The old lady was medium set, with auburn hair. Something like a smile appeared on her yellowing face.

"This could quite feasibly relate to the three well known PE types of diabetes, marked by raging thirst; keen appetite, and excessive micturition. But it is good that they have not put you on medication so far, or you would have become diabetic once and for all. I advise you to tackle your appetite using the Method. Bad temper is also a symptom, eradicable by the Method, and cold is another one! If you have not evacuated your system in the morning, that's another one! You can remove them all by using the Method". Dr Ozertsova had the faint suspicion that some people thought they were symptom-free, and had nothing to get rid of.
"When you have really learned how to remove any symptoms using the Method, you will start to take shallow breaths of your own accord. And by measuring the length of the pause we will be able to measure the depth of the breath. Your first priority is to learn how to remove your symptoms! " Clara Ozertsova drummed in Dr Buteyko's message for new patients at their first class. You should only take a pill if your attack shows no sign of subsiding after 10-15 minutes of using the Method. " She started wrapping up.

"And so, right now you should just start observing your breathing. Listen to it, but don't do anything to it! Learn how to relax, and how to scarcely breathe.

Ring me! And get your questions ready for the next class. In Moscow the course is just five days long and Dr Buteyko even suggested we adopt their model, but I was against."

Ozertsova looked in alarm at the door where the next group was already looking in.

"There is a lot of new vocabulary to learn, and we are training for ten days and by the time you leave us you will be qualified trainers for yourselves. Do you understand me? Now I'll give you handouts listing symptoms on these little cards.

--"Where can I get a stopwatch?" the young woman in the white jacket asked.

"Dr Buteyko advises you to manage without, and measure everything by your own count. But Berdsk used to have plastic stopwatches for sale for 30 roubles."

The second group was ready to storm the office, and Ozertsova obviously felt awkward keeping them out of the door.

--"Where do we pay for the class?" The dark haired man shouted who had turned up last.

"Fill in your questionnaires and we're quits. You can pay down in accounts, but now we will all go to the medical examination room"

Ozertsova hurried to the door. The medical examination was an essential part of the first class. It was there the doctor and trainer could get to know each patient in detail, and make notes they needed about every member of the group in their journal. Then in later classes, the trainer would know which of the patients to recommend for more intensive exercises at a future date – and which, like coronary survivors, should be treated with extreme care.

So Dr Ozertsova never sent the patients for their examinations unaccompanied. Here, one hour wasted was 100 hours gained, she thought – and so it turned out this time. After spending a couple of hours of her own time with the patients, by the second class she knew literally all that she would never have known from sketchy case notes based on a conversation with the patient. And not every patient had these case notes. A patient's live
narration about the state of their health at the medical examination naturally gave the trainer much more than some neutral, bureaucratic forms, and Dr Ozertsova was able to take her second class, supported by these warm, sincere human confessions.